Net Metering & Interconnection at Colorado Springs Utilities

February 22, 2006
Colorado Energy Science Center (CESC) Workshop

Colorado Springs Utilities
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Presentation Overview

- Amendment 37
- Net Metering Pilot Program
- Interconnection Agreement
- Renewable Energy Rebate Program

Amendment 37

- Amendment 37 (SB 143)
  - Our direction is to comply with Amendment 37
    - Customer base is split – A37 voted down, divided over willingness-to-pay
  - Municipal utilities - no solar targets, no net metering
- We support & encourage *voluntary* additions of RE to our system
- Springs Utilities' objectives with customer-side RE programs
  - Support the intent of Amendment 37
  - Provide customers greater choice
  - Be good stewards of the environment
  - Ensure safety and reliability of distributed energy resources
  - Gain experience with small-scale, distributed generation
  - Be an active partner in RE market development (e.g. PV)

Renewable Energy Net Metering Pilot Program

- Launched in 2004 to formalize what was an informal policy
- City Council approved “enhancements” in the 2006 Rate Case
- Current participation
  - Academy School District 10 – Mountain Ridge Middle School
  - 2 residential customers
- More systems expected due to rebate program
- See Renewable Energy Net Metering Rate Schedule (Sheet 34) - www.csu.org/customer/rates/rate_tariffs/2001.pdf

Net Metering Policy

- Limited to the first 50 customers to sign up before December 31, 2007
- Residential and business customers are eligible
- Eligible renewable energy technologies – PV, wind, biogas cogen
- System size limited to 10 kW (residential) or 25 kW (business)
- Monthly carry-over of generation credits
- Annual reconciliation of net generation –
  - Blended 18%/82% (on-peak/off-peak) of Small Power Producers and Cogeneration rate schedule (Sheet 35) - www.csu.org/customer/rates/rate_tariffs/2001.pdf
- Customers continue to pay the applicable monthly Access and Facilities charges.
- Subject to the ECA (Electric Cost Adjustment)
- Environmental attributes of generation belong to Colorado Springs Utilities
- Springs Utilities furnishes a separate meter at no charge (Customer furnishes meter socket)
- PV system is subject to future inspections and meter reading.
- Installations are subject to City of Colorado Springs zoning laws, building codes, and neighborhood Covenants and Restrictions.
- Must coordinate installation with System Quality department and sign an Interconnection Agreement.

Interconnection Agreement

- Standard technical requirements (see Appendix)
- No standby fees
- No additional liability insurance requirements
- Customer installs additional meter socket – Springs Utilities furnishes and installs recording meter
- Environmental attributes belong to Utilities
- Contract term – 5 years w/ annual renewal
- Download at www.csu.org/residential/rebates/renew_rebate/9576.pdf

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Experience So Far

Renewable Energy Rebate Program (Photovoltaics)

- $4 per watt (AC)
- Modest budget ($220,000)
- 2006 Participation goal – 60 kW
- Process
  - Reservation Request
  - Pre-Inspection
  - Rebate Claim
  - Post-Inspection
  - Interconnection Authorization
- More info at www.csu.org/residential/rebates/renew_rebate/index.html

Rebate Structure

- Quality assurance is important
- RERP structured to encourage design of PV systems for optimum performance pay based on AC watts Several factors can degrade system performance:
  - module temperature
  - orientation (azimuth),
  - tilt
  - shading of the array
  - inverter efficiency.
- Rebate payment formulae:
  1. **AC watts** = (# of modules) x (PTC module rating) x (inverter efficiency) x (de-rating factor for orientation and tilt) x (percent annual shading)
  2. **Rebate payment** = AC watts x $4/ACWatt

General Program Requirements

- Systems must be installed at a premise receiving Springs Utilities electric service, or in the case of new construction, at a premise titled in the Customer's name.
- Equipment purchase(s) and installation(s) must occur from Jan 1 to Dec 31, 2006.
- Participants must submit complete Reservation Request Form and Rebate Claim Form with required attachments
  1. Interconnection Agreement
  2. completed IRS Form W-9
  3. an approved copy and final sign-off of the building permit
  4. copy of the final purchase and installation invoices (itemized).
- All forms must be postmarked by the submittal deadlines
- Participants must receive electric service under the Renewable Energy Net Metering tariff
- Reservations are offered on a first come, first served basis and are subject to eligibility and availability of funds. Reservations are non-transferable.
- Installation site is subject to inspection by Colorado Springs Utilities staff at any time
- Total rebate payments may not exceed the total installed cost of the system.

System/Installation Requirements

- Qualifying PV modules must be included in the CEC List of Eligible PV Modules
- Qualifying inverters must be included in the CEC List of Eligible Inverters
- Qualifying systems must::
  - Comply with the system design standards required in the Interconnection Agreement
  - Be new equipment.
  - Be for personal use only, NOT FOR RESALE.
  - Remain interconnected to Colorado Springs Utilities electric system and operational for a minimum of five (5) years, or the rebate payment amount will be billed to the Customer.
  - Have a minimum system capacity of 500 Watts, and maximum capacity of 10kW (res), 25kW (bus)
- Qualifying systems must *not*:
  - Be connected to the electric system prior to authorization from Springs Utilities.
  - Be installed with a north-facing orientation.
  - Be installed at a site that is more than 50 percent shaded on an annual basis.
- Qualifying systems must carry warranties for the following minimum specified period(s):
  - PV system – five (5) years: Installer must provide, unless system installed by customer.
  - Inverter - five (5) years: Manufacturer must provide.
  - PV modules - twenty (20) years: Manufacturer must provide.

Questions???

Simon Eilif Baker,
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Technical Requirements

- "IEEE 929-2000"
  - Normal voltage operating range: 88 to100% (106V to 132V)
  - Voltage Flicker: must meet IEEE 519-1992
  - Frequency: 59.3Hz to 60.5Hz
  - Waveform Distortion: THD < 5% plus individual limits

Odd harmonics	Distortion limit
3rd–9th	< 4.0%
11th –15th	< 2.0%
17th– 21st	< 1.5%
23rd–33rd	< 0.6%
Above the 33rd	< 0.3%

  - Power Factor: Operate at 0.85 (leading or lagging)
  - Response to abnormal utility conditions:

Voltage (at PCC)	Maximum trip time[1]
V < 60 (V < 50%)	6 cycles
60 ≤ V < 106 (50% ≤ V< 88%)	120 cycles
106 ≤ V≤ 132 (88% ≤V≤ 110%)	Normal operation
132 < V < 165 (110% < V < 137%)	120 cycles
165 ≤ V (137% ≤ V)	2 cycles

Technical Requirements (cont.)

- UL 1741 – *Standard for Static Inverters and Charge Controllers for Use in Photovoltaic Systems*
- UL 1703 – *Standard for Safety: Flat-Plate Photovoltaic Modules and Panels.*
- NEC Article 690 - *Solar Photovoltaic Systems*
- NEC Article 705 – *Interconnected Electric Power Production Systems*
- Regional Building – permitting and approval